



BABA FARID COLLEGE OF ENGG. & TECHNOLOGY

DEPARTMENT CIVIL ENGINEERING (PEO/PO/PSO/CO)

Program Educational Objectives (PEO)


The graduates of Civil Engineering will

- **PEO1:** Apply technical expertise to identify and resolve any complex civil engineering problems with the help of modern engineering tools and lifelong learning to meet the specified needs of their chosen domain viz. employment, higher studies or research and development.
- **PEO2:** Develop cost-effective solutions for a sustainable environment with deep insight in societal and ecological issues by adhering to professionalism.
- **PEO3:** Exhibit professional ethics, management and leadership qualities with good communication skills facilitating to work in a multidisciplinary team for evolving as an entrepreneur.

Programme Outcomes (PO)

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.


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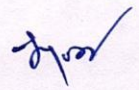
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
9. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
10. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
11. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes (PSOs)

1. **Innovative Design in Civil Engineering:** The ability to create innovative designs with new materials of minimum embodied energy through research and development focusing on global quality of life by observing professional ethics.
2. **Civil Engineer and Sustainability:** The ability to recognize the need of the hour like housing, sanitation, waste management, irrigation, use of renewable energy etc. for a sustainable environment.
3. **Civil Engineering Analysis and Design tools:** The ability to analyze the effects of natural calamities like earthquakes, landslides etc. including disaster management and to design stable structures for relevant stress resultants.

Course Outcomes

After completing the course students will be able to				
Program	Course Code	Course	CO No.	Course outcome
B.Tech (Civil Engineering)	BCHM0-101	Chemistry-I	BCHM0-101.CO1	analyze microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
			BCHM0-101.CO2	rationalize bulk properties and processes using thermodynamic considerations.
			BCHM0-101.CO3	distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques


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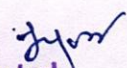
			BCHM0-101.CO4	rationalize periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
			BCHM0-101.CO5	list major chemical reactions that are used in the synthesis of molecules.
B.Tech (Civil Engineering)	BMAT0-101	Mathematics-I	BMAT0-101.CO1	apply differential and integral calculus to notions of curvature and to improper integrals. Apart from some other applications they will have a basic understanding of Beta and Gamma functions.
			BMAT0-101.CO2	fallouts of Rolle's Theorem that is fundamental to application of analysis to Engineering problems.
			BMAT0-101.CO3	use tool of power series and Fourier series for learning advanced Engineering Mathematics.
			BMAT0-101.CO4	deal with functions of several variables that are essential in most branches of engineering.
			BMAT0-101.CO5	learn essential tool of matrices and linear algebra in a comprehensive manner.
B.Tech (Civil Engineering)	BHUM0-101	English	BHUM0-101.CO1	acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.
B.Tech (Civil Engineering)	BCSE0-101	Programming for Problem Solving	BCSE0-101.CO1	formulate simple algorithms for arithmetic and logical problems
			BCSE0-101.CO2	translate the algorithms to programs (in C language).
			BCSE0-101.CO3	test and execute the programs and correct syntax and logical errors.
			BCSE0-101.CO4	implement conditional branching, iteration and recursion.
			BCSE0-101.CO5	decompose a problem into functions and synthesize a complete program using divide and conquer approach.
			BCSE0-101.CO6	use arrays, pointers and structures to formulate


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				algorithms and programs.
			BCSE0-101.CO7	apply programming to solve matrix addition and multiplication problems and searching and sorting problems.
			BCSE0-101.CO8	apply programming to solve simple numerical method problems, namely root finding of function, differentiation of function and simple integration.
B.Tech (Civil Engineering)	BCHM0-102	Chemistry-I Lab.	BCHM0-102.CO1	estimate rate constants of reactions from concentration of reactants/products as a function of time
			BCHM0-102.CO2	measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc.
			BCHM0-102.CO3	synthesize a small drug molecule and analyze a salt sample
B.Tech (Civil Engineering)	BHUM0-102	English Lab.	BHUM0-102.CO1	cover comprehensive exposition to lexical derivatives and word-formation
			BHUM0-102.CO2	understand the mechanics of writing: semantics
			BHUM0-102.CO3	identify errors and non-native flaws in English sentence framework
			BHUM0-102.CO4	learn nature and style of writing with varied writing forms
B.Tech (Civil Engineering)	BCSE0-102	Programming for Problem Solving Lab.	BCSE0-102.CO1	understand C programming development environment, compiling, debugging, linking and executing a program using the development environment.
			BCSE0-102.CO2	analyzing the complexity of problems, modularize the problems into small modules and then convert into programs
			BCSE0-102.CO3	understand and apply the inbuilt functions and customized functions for solving the problems.


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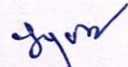
			BCSE0-102.CO4	understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems
B.Tech (Civil Engineering)	BMFP0-101	Manufacturing Practices	BMFP0-101.CO1	gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.
			BMFP0-101.CO2	fabricate components with their own hands.
			BMFP0-101.CO3	get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
			BMFP0-101.CO4	produce small devices of their interest by assembling different components.
B.Tech (Civil Engineering)	BHUM0-103	Human Values & Professional Ethics	BHUM0-103.CO1	understand meaning of values, Values as social fact and Universal values
			BHUM0-103.CO2	understand values, morality, ethics and their relation with Religion
			BHUM0-103.CO3	understand meaning and types of Professional Ethics, Goals of professional work and their problems
			BHUM0-103.CO4	understand the technology for and against mankind and environment
B.Tech (Civil Engineering)	BPHY0-101	Physics	BPHY0-101.CO1	understand the basics of Electromagnetism, Electrostatics in vacuum and in linear dielectric medium and electromagnetic waves.
			BPHY0-101.CO2	understand the basics of Faraday laws and evaluate the Maxwell's equations in different medium.
			BPHY0-101.CO3	understand the phenomenon of Magnetostatics and magnetostatic in linear magnetic medium.
			BPHY0-101.CO4	understand the Relation between electric and magnetic field of EM wave


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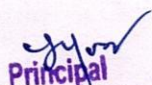
B.Tech (Civil Engineering)	BMAT0- 201	Mathematics-II	BMAT0- 201.CO1	use the mathematical tools needed in evaluating multiple integrals and their usage.
			BMAT0- 201.CO2	use effective mathematical tools for the solutions of differential equations that model physical processes.
			BMAT0- 201.CO3	use tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems.
B.Tech (Civil Engineering)	BMEE0- 101	Engineering Graphics & Design	BMEE0- 101.CO1	get a basic understanding of engineering drawing and its principles.
			BMEE0- 101.CO2	get exposure to drawing, drafting techniques and interpretation of drawing Scales
			BMEE0- 101.CO3	learn about the projection of Point, line, Planes and regular solids.
			BMEE0- 101.CO4	understand and learn the development of surfaces.
			BMEE0- 101.CO5	draw and design the Isometric and Orthographic Projections of Simple and compound Solids.
B.Tech (Civil Engineering)	BELE0- 101	Basics Electrical Engineering	BELE0- 101.CO1	understand and analyze basic DC and AC circuits
			BELE0- 101.CO2	study the use and working principle of single phase transformers.
			BELE0- 101.CO3	study the application and working principles of three phase and single phase induction motors.
			BELE0- 101.CO4	To introduce to the components of low voltage electrical installations
B.Tech (Civil Engineering)	BPHY0- 102	Physics Lab.	BPHY0- 102.CO1	understand the working of CRO
			BPHY0- 102.CO2	understand the concept of oscillation in LCR Circuits
			BPHY0- 102.CO3	understand the properties of Magnetic material
			BPHY0- 102.CO4	get knowledge about the electric circuit (LC and RC circuits)


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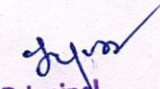
B.Tech (Civil Engineering)	BELE0- 102	Basics Electrical Engineering Lab.	BELE0- 102.CO1	get an exposure to common electrical components and their ratings
			BELE0- 102.CO2	make electrical connections by wires of appropriate ratings
			BELE0- 102.CO3	understand the usage of common electrical measuring instruments.
			BELE0- 102.CO4	understand the basic characteristics of transformers and electrical induction motors.
			BMEE0- 102.CO1	get exposure to computer-aided geometric design
			BMEE0- 102.CO2	get exposure to creating working drawings
			BMEE0- 102.CO3	get exposure to engineering communication
B.Tech (Civil Engineering)	BMEE0- 102	Engineering Graphics & Design Lab.	BMEE0- 102.CO1	get exposure to computer-aided geometric design
			BMEE0- 102.CO2	get exposure to creating working drawings
			BMEE0- 102.CO3	get exposure to engineering communication
B.Tech (Civil Engineering)	BHUM0- 105	Drug Abuse: Problem, Management and Prevention	BHUM0- 105.CO1	understand prevention of Drug Abuse
			BHUM0- 105.CO2	understand treatment and Control of Drug Abuse
B.Tech (Civil Engineering)	BECEE0- 001	Basic Electronics	BECEE0- 001.CO1	know broadly the concepts and functionalities of the electronic devices, tools and instruments
			BECEE0- 001.CO2	understand use, general specifications and deploy abilities of the electronic devices, and assemblies
			BECEE0- 001.CO3	confidence in handling and usage of electronic devices, tools and instruments in engineering applications
B.Tech (Civil Engineering)	BCIES1- 301	Computer-aided Civil Engineering Drawing	BCIES1- 301.CO1	develop Parametric design and the conventions of formal engineering drawing
			BCIES1- 301.CO2	develop graphical skills for communicating concepts, ideas and designs of engineering products graphically/ visually as well as understand another


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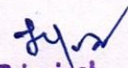
				person's designs,
			BCIES1-301.CO3	communicate a design idea/concept graphically/visually
			BCIES1-301.CO4	examine a design critically and with understanding of CAD - The student learn to interpret drawings, and to produce designs using a combination of 2D and 3D software.
			BCIES1-301.CO5	get a detailed study of an engineering artifact
B.Tech (Civil Engineering)	BMECE0-001	Engineering Mechanics	BMECE0-001.CO1	tackle equilibrium equations, moments and inertia problems
			BMECE0-001.CO2	get master calculator/computing basic skills to use to advantage in solving mechanics problems.
			BMECE0-001.CO3	gain a firm foundation in Engineering Mechanics for furthering the career in Engineering
B.Tech (Civil Engineering)	BCIESI-302	Energy Science and Engineering	BCIESI-302.CO1	understanding of the energy sources and scientific concepts/principles behind them
			BCIESI-302.CO2	quantify energy demands and make comparisons among energy uses, resources, and technologies and describe the challenges and problems associated with the use of various energy sources, including fossil fuels, with regard to future supply and the impact on the environment.
			BCIESI-302.CO3	understand the Engineering involved in projects utilizing these sources
			BCIESI-302.CO4	understand the concept of green buildings, Architecture, materials, construction technology, certification by agencies


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B.Tech (Civil Engineering)	BCIESI- 303	Surveying	BCIESI- 303.CO1	calculate angles, distances and levels
			BCIESI- 303.CO2	identify data collection methods and prepare field notes
			BCIESI- 303.CO3	understand the working principles of survey instruments
			BCIESI- 303.CO4	estimate measurement errors and apply corrections
			BCIESI- 303.CO5	interpret survey data and compute areas and volumes
B.Tech (Civil Engineering)	BMATH4- 301	Mathematics III	BMATH4- 301.CO1	get idea of Laplace transform of functions and their application
			BMATH4- 301.CO2	get idea of Fourier transform of functions and their applications
			BMATH4- 301.CO3	get basic ideas of logic and Group and uses
			BMATH4- 301.CO4	get ideas of sets, relation, function and counting techniques
			BMATH4- 301.CO5	get idea of lattices, Boolean algebra, Tables
B.Tech (Civil Engineering)	BHSMC0- 005	Humanities I	BHSMC0- 005.CO1	communicate effectively
			BHSMC0- 005.CO2	integrate technology
			BHSMC0- 005.CO3	demonstrate cooperative teamwork skills F. G.
			BHSMC0- 005.CO4	apply safety in the workplace
			BHSMC0- 005.CO5	think critically and creatively
			BHSMC0- 005.CO6	demonstrate responsible work ethics
B.Tech (Civil Engineering)	BHSMC0- 021	Introduction to Civil Engineering	BHSMC0- 021.CO1	identifying the various areas available to pursue and specialize within the overall field of Civil Engineering.
			BHSMC0- 021.CO2	exploration of the various possibilities of a career in this field
			BHSMC0- 021.CO3	understanding the vast interfaces this field has with the society at large


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			BHSMC0-021.CO4	highlighting possibilities for taking up entrepreneurial activities in this field
			BHSMC0-021.CO5	providing a foundation for the student to launch off upon an inspired academic pursuit into this branch of engineering.
B.Tech (Civil Engineering)	BECEE0-002	Basic Electronics Lab	BECEE0-002.CO1	develop hand-son skills and knowledge about the electronic equipment such as oscilloscopes, function generators, multimeter, timers etc. and electronics devices such as diode, Zener diode, Transistor etc
			BECEE0-002.CO2	implement different types of electronic circuits using the techniques, skills, and modern engineering tools vital for engineering practice.
			BECEE0-002.CO3	analyse complex networks of resistors, inductors, capacitors, diodes, transistors and op-amp subject to both direct (non-time-varying) and alternating voltages and currents.
			BECEE0-002.CO4	design, build and test electronic circuit project application utilizing knowledge and skills learned and using electronic test and measurement instruments in experimental research.
B.Tech (Civil Engineering)	BCIES1-304	Computer-aided Civil Engineering Drawing Lab	BCIES1-304.CO1	design and draw working structural drawings of various concrete structures and their members.
			BCIES1-304.CO2	understand and interoperate design aids and handbooks.
			BCIES1-304.CO3	use of relevant Indian Standard specifications applicable to Reinforced concrete structures
B.Tech (Civil Engineering)	BCIES1-305	Surveying Lab.	BCIES1-305.CO1	interpret horizontal & Vertical measurement in the field.
			BCIES1-305.CO2	enumerate about Plane Table surveying.
			BCIES1-305.CO3	estimate vertical measurement with the help of Leveling in the


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				field.
			BCIES1-305.CO4	apply indirect methods & demonstration of minor instruments.
			BCIES1-305.CO5	understand the method to determine the measurements indirectly and digital techniques.
B.Tech (Civil Engineering)	BCIES1-306	Training-I	BCIES1-306.CO1	understand the appropriate tools, materials, instruments required for specific operations in workshop.
			BCIES1-306.CO2	apply techniques to perform basic operations with hand tools and power tools such as center lathe machine, drilling machine using given job drawing.
			BCIES1-306.CO3	understand the figures of the hand tools used in fitting, carpentry, foundry, welding shop and machine tools such as lathe machine and drilling machine.
			BCIES1-306.CO4	understand a report related to hand tools and machine tools description referring to library books and laboratory manuals.
			BCIES1-306.CO5	understand report of procedures followed for a given task in fitting, carpentry, foundry, sheet metals, welding and machine shops.
			BCIES1-306.CO6	apply safety consciousness and show team work.
B.Tech (Civil Engineering)	BMECE0-002	Mechanical Engineering	BM.ECE0-002.CO1	apply mathematics, science, and engineering
			BM.ECE0-002.CO2	design and conduct experiments, as well as to analyze and interpret data
			BM.ECE0-002.CO3	identify, formulate, and solve engineering problems
			BM.ECE0-002.CO4	apply modern engineering tools, techniques and resources to solve complex mechanical engineering activities with an understanding of the limitations.


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			BM.ECE0-002.CO5	comprehend the thermodynamics and their corresponding processes that influence the behaviour and response of structural components
			BM.ECE0-002.CO6	apply principles of engineering, basic science, and mathematics (including multivariate calculus and differential equations) and thermodynamics to model, analyze, design, and realize physical systems, components, or processes
B.Tech (Civil Engineering)	BCIES1-401	Instrumentation & Sensor Technologies for Civil Engineering Applications	BCIES1-401.CO1	analyze the errors during measurements
			BCIES1-401.CO2	specify the requirements in the calibration of sensors and instruments
			BCIES1-401.CO3	describe the noise added during measurements and transmission
			BCIES1-401.CO4	describe the measurement of electrical variables
			BCIES1-401.CO5	describe the requirements during the transmission of measured signals
			BCIES1-401.CO6	construct Instrumentation/Computer Networks
			BCIES1-401.CO7	suggest proper sensor technologies for specific applications
			BCIES1-401.CO8	design and set up measurement systems and do the studies
B.Tech (Civil Engineering)	BCIES1-402	Engineering Geology	BCIES1-402.CO1	do site characterization and how to collect, analyze, and report geologic data using standards in engineering practice
			BCIES1-402.CO2	understand fundamentals of the engineering properties of Earth materials and fluids.

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			BCIES1-402.CO3	do rock mass characterization and the mechanics of planar rock slides and topples.
			BCIES1-402.CO4	do soil characterization and the Unified Soil Classification System.
			BCIES1-402.CO5	understand mechanics of soils and fluids and their influence on settlement, liquefaction, and soil slope stability.
B.Tech (Civil Engineering)	BCIES1-403	Disaster Preparedness and Planning	BCIES1-403.CO1	understand basic concepts in Disaster Management
			BCIES1-403.CO2	understand Definitions and Terminologies used in Disaster Management
			BCIES1-403.CO3	understand Types and Categories of Disasters
			BCIES1-403.CO4	understand the Challenges posed by Disasters
			BCIES1-403.CO5	understand Impacts of Disasters Key Skills
B.Tech (Civil Engineering)	BCIES1-404	Introduction to Fluid Mechanics	BCIES1-404.CO1	understand the broad principles of fluid statics, kinematics and dynamics
			BCIES1-404.CO2	understand definitions of the basic terms used in fluid mechanics
			BCIES1-404.CO3	understand classifications of fluid flow
			BCIES1-404.CO4	apply the continuity, momentum and energy principles
			BCIES1-404.CO5	apply dimensional analysis
B.Tech (Civil Engineering)	BCIES1-405	Introduction to Solid Mechanics	BCIES1-405.CO1	describe the concepts and principles, understand the theory of elasticity including strain/displacement and Hooke's law relationships; and perform calculations, relative to the strength and stability of structures and mechanical components;
			BCIES1-405.CO2	define the characteristics and calculate the magnitude of combined stresses in individual members and complete


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				structures; analyze solid mechanics problems using classical methods and energy methods
			BCIES1-405.CO3	analyse various situations involving structural members subjected to combined stresses by application of Mohr's circle of stress; locate the shear center of thin wall beams
			BCIES1-405.CO4	Calculate the deflection at any point on a beam subjected to a combination of loads; solve for stresses and deflections of beams under unsymmetrical loading; apply various failure criteria for general stress states at points; solve torsion problems in bars and thin walled members
B.Tech (Civil Engineering)	BCIES1-406	Geomatics Engineering	BCIES1-406.CO1	identify the potential use of Photography, Flight planning in Civil Engineering.
			BCIES1-406.CO2	know the environmental regulations and about the satellites considered in Civil Engineering
			BCIES1-406.CO3	understand the methods and tools of identification used in GPS
			BCIES1-406.CO4	identify the potential use of Remote Sensing and GIS in Civil Engineering
B.Tech (Civil Engineering)	BCIES1-407	Material Testing and Evaluation	BCIES1-407.CO1	get knowledge of different materials and other aspects related to them
			BCIES1-407.CO2	conduct various test on different building materials.
			BCIES1-407.CO3	operate data acquisition system and testing machines
			BCIES1-407.CO4	identify failure type and write laboratory report.
B.Tech (Civil Engineering)	BHSMC0-022	Civil Engineering Societal and Global Impact	BHSMC0-022.CO1	understand the impact which Civil Engineering projects have on the Society at large and on the global arena and using resources efficiently and effectively.

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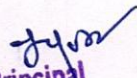
			BHSMC0-022.CO2	understand the extent of Infrastructure, its requirements for energy and how they are met: past, present and future.
			BHSMC0-022.CO3	understand the sustainability of the Environment, including its Aesthetics.
			BHSMC0-022.CO4	get the potentials of Civil Engineering for Employment creation and its Contribution to the GDP.
			BHSMC0-022.CO5	built Environment and factors impacting the Quality of Life.
B.Tech (Civil Engineering)	BMNCC0-005	Management I	BMNCC0-005.CO1	identify global environmental problems arising due to various engineering/industrial and technological activities and the science behind these problems
			BMNCC0-005.CO2	realize the importance of ecosystem and biodiversity for maintaining ecological balance
			BMNCC0-005.CO3	identify the major pollutants and abatement devices for environmental management and sustainable development.
			BMNCC0-005.CO4	estimate the current world population scenario and thus calculating the economic growth, energy requirement and demand.
			BMNCC0-005.CO5	understand the conceptual process related with the various climatologically associated problems and their plausible solutions.
B.Tech (Civil Engineering)	BCIES1-408	Instrumentation & Sensor Technologies for Civil Engineering Applications Lab	BCIES1-408.CO1	summarize various performance characteristics of instruments and the quality of measurement
			BCIES1-408.CO2	Interpret the type of transducer based on the transduction principles
			BCIES1-408.CO3	Identify the relevant transducer for measurement of physical quantities
			BCIES1-408.CO4	Discover the additional attributes in advanced sensors and their role in Civil


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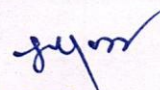
				Engineering
B.Tech (Civil Engineering)	BCIES1- 409	Engineering Geology Lab	BCIES1- 409.CO1	categorize rocks and minerals by their origin and engineering properties.
			BCIES1- 409.CO2	apply geological principles to rock masses and discontinuities for use in engineering design.
			BCIES1- 409.CO3	gain an understanding of the societal relevance of Geological system.
			BCIES1- 409.CO4	gain life-long learning of students about the identification of minerals and rocks.
B.Tech (Civil Engineering)	BEIES1- 410	Fluid Mechanics Lab	BEIES1- 410.CO1	learn the various concepts relating to fluid statics for floating & submerged bodies.
			BEIES1- 410.CO2	calculate discharge through various cross-sections.
			BEIES1- 410.CO3	understand the importance of Reynolds number.
			BEIES1- 410.CO4	identify, formulate and calculate different coefficients of fluids and head losses in pipe line.
B.Tech (Civil Engineering)	BEIES1- 411	Solid mechanics lab	BEIES1- 411.CO1	check strength of various materials.
			BEIES1- 411.CO2	check the hardness of the material.
			BEIES1- 411.CO3	determine the stress strain relationship of various elements.
B.Tech (Civil Engineering)	BEIES1- 412	Materials, Testing & Evaluation Lab	BEIES1- 412.CO1	identify the different engineering materials, properties, manufacturing process of materials.
			BEIES1- 412.CO2	describe the mechanical behaviour and characteristics, elastic and plastic deformation of metals, strength properties and background of fracture mechanics.
			BEIES1- 412.CO3	conduct mechanical testing of various metals like iron, steel and various non-ferrous metals, impact testing, background of


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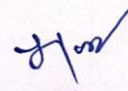
				fracture toughness of different materials, creep, fatigue
			BEIES1-412.CO4	understand the standard testing procedure of bricks, sand, concrete, soils, bitumen and bitumen mixes.
			BEIES1-412.CO5	describe the properties, mechanical behaviour of polymers, metals, composites, cementitious materials and special materials.
B.Tech (Civil Engineering)	BCIES1-501	Design of Concrete Structures-I	BCIES1-501.CO1	identify the different failure modes and determine their design strengths.
			BCIES1-501.CO2	select the most suitable section shape and size for beams according to specific design criteria.
B.Tech (Civil Engineering)	BCIES1-502	Structural Analysis I	BCIES1-502.CO1	possess the skills to solve statically determinate problems of structural analysis dealing with different loads.
			BCIES1-502.CO2	apply their knowledge of structural analysis to address structural design problems
B.Tech (Civil Engineering)	BCIES1-503	Geotechnical Engineering	BCIES1-503.CO1	apply their knowledge of various phase diagrams and derive various phase relationships of the soil.
			BCIES1-503.CO2	apply their knowledge of index properties
			BCIES1-503.CO3	apply their knowledge of the engineering properties of soil.
			BCIES1-503.CO4	apply their knowledge of stability of slopes.
B.Tech (Civil Engineering)	BCIES1-504	Environmental Engineering	BCIES1-504.CO1	estimate sewage generation and design sewer system including Sewage pumping stations
			BCIES1-504.CO2	get required understanding on the characteristics and composition of sewage, self Purification of streams
			BCIES1-504.CO3	perform basic design of the unit operations and processes for sewage treatment


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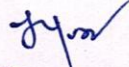
			BCIES1-504.CO4	develop and conduct appropriate experimentation, analyze and interpret data for future sewage generation & handling
B.Tech (Civil Engineering)	BCIED1-513	Concrete Construction Technology	BCIED1-513.CO1	understand the behaviour of fresh and hardened concrete.
			BCIED1-513.CO2	make aware the recent developments in concrete technology.
			BCIED1-513.CO3	understand factors affecting the strength, workability and durability of concrete
			BCIED1-513.CO4	impart the methods of proportioning of concrete mixtures.
B.Tech (Civil Engineering)	BCIED1-521	Building Materials and Construction	BCIED1-521.CO1	predict the properties of building stones and its classifications
			BCIED1-521.CO2	understand the concept of various methods of manufacture of bricks
			BCIED1-521.CO3	explain various types of cements and their applications in construction. Various field and laboratory tests on cement
			BCIED1-521.CO4	analyze the importance of mineral and chemical admixtures, requirements of the concrete in construction
			BCIED1-521.CO5	explain the suitability of floors in buildings like mosaic flooring, terrazzo flooring, rubber flooring, asphalt flooring.
			BCIED1-521.CO6	explain the foundations and uses of different types of foundations
B.Tech (Civil Engineering)	BCIES1-505	Concrete Technology Lab	BCIED1-521.CO7	classification of various types of woods and properties, seasoning of timber
			BCIES1-505.CO1	determine the consistency, setting time, fineness, specific gravity, compressive strength, etc. of cement.
			BCIES1-505.CO2	determine the fineness modulus, grading, density & specific gravity of aggregates


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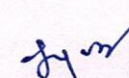
			BCIES1-505.CO3	determine the shape & size, compressive strength and water absorption of bricks & pavers
			BCIES1-505.CO4	describe the properties of concrete & knowledge of concrete mix design philosophy.
			BCIES1-505.CO5	determine the optimum dose of admixtures for concrete.
B.Tech (Civil Engineering)	BCIES1-506	Structural Analysis Lab	BCIES1-506.CO1	effectively link the theory / analytical concepts
			BCIES1-506.CO2	demonstrate the background of the theoretical aspects, with practice and application.
			BCIES1-506.CO3	generate and analyze data using experiments and develop observational skill by the exposure to equipment and machines.
			BCIES1-506.CO4	use computing tools in analyzing and presentation of the experimental data.
B.Tech (Civil Engineering)	BCIES1-507	Geotechnical Engineering Lab	BCIES1-507.CO1	get knowledge about the procedures of laboratory tests used for determination of physical, index and engineering properties of soils
			BCIES1-507.CO2	get capability to classify soils based on test results and interpret engineering behaviour based on test results
			BCIES1-507.CO3	evaluate the permeability and shear strength of soils
			BCIES1-507.CO4	evaluate settlement characteristics of soils
			BCIES1-507.CO5	evaluate compaction characteristics required for field application
B.Tech (Civil Engineering)	BCIES1-508	Environmental Engineering Lab	BCIES1-508.CO1	discuss about importance of water and its quality analysis
			BCIES1-508.CO2	analyse various physico-chemical and biological parameters of water in case of quality requirements.
			BCIES1-508.CO3	assess complete water quality assessment for EIA and domestic supplies.


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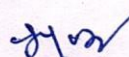
			BCIES1-508.CO4	suggest various types of treatment methods required to purify raw water with different contaminants
			BCIES1-508.CO5	assess complete waste water quality assessment for their disposal
B.Tech (Civil Engineering)	BCIES1-509	Training-II	BCIES1-509.CO1	understand the usage of various engineering software's and modern engineering tools.
			BCIES1-509.CO2	analyse industry related practical problems using software.
			BCIES1-509.CO3	understand industrial environment and practical problems faced by industries.
			BCIES1-509.CO4	understand importance of team work and handle industrial assignments.
B.Tech (Civil Engineering)	BCIES1-601	Design of Steel Structures-I	BCIES1-601.CO1	identify the different failure modes of bolted and welded connections, and determine their design strengths.
			BCIES1-601.CO2	identify the different failure modes of steel tension and compression members and beams, and compute their design strengths
			BCIES1-601.CO3	select the most suitable section shape and size for tension and compression members and beams according to specific design criteria
B.Tech (Civil Engineering)	BCIES1-602	Structural Analysis II	BCIES1-602.CO1	possess the skills to solve statically indeterminate problems of structural analysis dealing with different loads.
			BCIES1-602.CO2	apply their knowledge of structural analysis to address structural design problems.
B.Tech (Civil Engineering)	BCIES1-603	Transportation Engineering I	BCIES1-603.CO1	learn about essentials of highway planning and features of highway development in India
			BCIES1-603.CO2	learn how to do selection of highway alignment and design the geometric elements of highways


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			BCIES1-603.CO3	learn how to carry out traffic studies and implement traffic regulation and control measures and intersection design
			BCIES1-603.CO4	know about characteristic properties of road construction materials and design the flexible and rigid pavements as per IRC guidelines
B.Tech (Civil Engineering)	BCIES1-604	Foundation Engineering	BCIES1-604.CO1	learn about types and purposes of different foundation systems and structures
			BCIES1-604.CO2	have an exposure to the systematic methods for designing foundations
			BCIES1-604.CO3	evaluate the feasibility of foundation solutions to different types of soil conditions considering the time effect on soil behaviour.
			BCIES1-604.CO4	have necessary theoretical background for design and construction of foundation systems.
B.Tech (Civil Engineering)	BCIED1-611	Irrigation Engineering I	BCIED1-611.CO1	recognize the concepts, techniques and modernization of irrigation
			BCIED1-611.CO2	plan and design lined and un-lined canals for irrigations
			BCIED1-611.CO3	apply different theories/ methods to design lined and un-lined canals
			BCIED1-611.CO4	learn losses in canals and its control measures.
			BCIED1-611.CO5	design and construction of well and tube well
			BCIED1-611.CO6	learn about river training works
B.Tech (Civil Engineering)	BCIED1-621	Construction Project Planning and Systems	BCIED1-621.CO1	learn the structure of construction companies
			BCIED1-621.CO2	learn the management functions of construction companies
			BCIED1-621.CO3	practise contract management applications
			BCIED1-621.CO4	use project management applications

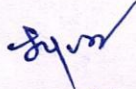

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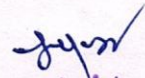
			BCIED1-621.CO5	plan construction projects
			BCIED1-621.CO6	pain information about construction risk analysis
B.Tech (Civil Engineering)	BCIED1-631	Water and Watewater Treatment	BCIED1-631.CO1	apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, welfare, and environmental factors.
			BCIED1-631.CO2	develop and conduct appropriate experimentation, analyze and interpret data for future demand & supply
			BCIED1-631.CO3	estimate sewage generation and design sewer system including Sewage pumping stations
			BCIED1-631.CO4	get understanding on the characteristics and composition of sewage, self Purification of streams
			BCIED1-631.CO5	perform basic design of the unit operations and processes for sewage treatment
B.Tech (Civil Engineering)	BCIES1-605	Transportaion Engineering Lab	BCIES1-605.CO1	learn the laboratory testing of different kinds of highway construction materials such as Soil, Aggregate and Bitumen.
			BCIES1-605.CO2	check the suitability of highway construction material so as to exercise better quality control in a road construction project.
B.Tech (Civil Engineering)	BCIES1-606	CAD Lab II	BCIES1-606.CO1	design and draw working structural drawings of various concrete structures and their members
			BCIES1-606.CO2	understand and interoperate design aids and handbooks
			BCIES1-606.CO3	use of relevant Indian Standard specifications applicable to Reinforced concrete structures
B.Tech (Civil Engineering)	BCIES1-701	Design of Concrete Structures-II	BCIES1-701.CO1	introduce concepts of design of various special structural elements.
			BCIES1-701.CO2	undertake design problems on design of building frames.


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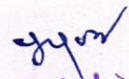
			BCIES1-701.CO3	undertake design problems on design of water tanks & Domes.
			BCIES1-701.CO4	design RCC cantilever Walls
B.Tech (Civil Engineering)	BCIES1-702	Professional Practice and Law	BCIES1-702.CO1	know the importance of preparing the types of estimates and analysis of rates under different conditions
			BCIES1-702.CO2	know about detailed specifications of items used in civil construction.
			BCIES1-702.CO3	know about tenders, Cash book, Muster roll and account procedures.
			BCIES1-702.CO4	ability to find out value to different construction building and arbitration act.
B.Tech (Civil Engineering)	BCIED1-711	Irrigation Engineering II	BCIED1-711.CO1	understand canal head-works and various hydraulic structures using various design philosophies.
			BCIED1-711.CO2	have knowledge of canal regulation works and related hydraulic structures.
			BCIED1-711.CO3	understand the concept of canal outlet and cross drainage works.
			BCIED1-711.CO4	understand the weirs and energy dissipating devices.
			BCIED1-711.CO5	understand location and necessity of canal falls.
B.Tech (Civil Engineering)	BCIED1-721	Prestressed Concrete	BCIED1-721.CO1	understand the general mechanical behavior of prestressed concrete.
			BCIED1-721.CO2	analyze and design prestressed concrete flexural members.
			BCIED1-721.CO3	analyze and design for vertical and horizontal shear in prestressed concrete.
B.Tech (Civil Engineering)	BMNCC0-006	Essence of Indian Knowledge Tradition	BMNCC0-006.CO1	understand philosophy of Indian culture.
			BMNCC0-006.CO2	distinguish the Indian languages and literature among difference traditions.
			BMNCC0-006.CO3	learn the philosophy of ancient, medieval and modern India.


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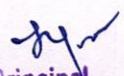
			BMNCC0-006.CO4	. acquire the information about the fine arts in India
B.Tech (Civil Engineering)	BCIES1-703	Project I	BCIES1-703.CO1	demonstrate a depth of knowledge of Civil Engineering.
			BCIES1-703.CO2	demonstrate knowledge of contemporary issues in their chosen field of research.
			BCIES1-703.CO3	design engineering solutions to complex problems utilizing a systems approach.
			BCIES1-703.CO4	communicate with engineers and the community at large in written an oral forms.
B.Tech (Civil Engineering)	BCIES1-704	Software Lab	BCIES1-704.CO1	design the whole project like roads, building etc. with the help of software.
			BCIES1-704.CO2	deal with project management in real time
B.Tech (Civil Engineering)	BCIES1-705	Training-III	BCIES1-705.CO1	understand the usage of various engineering software's and modern engineering tools.
			BCIES1-705.CO2	analyse industry related practical problems using software.
			BCIES1-705.CO3	understand industrial environment and practical problems faced by industries.
			BCIES1-705.CO4	understand importance of team work and handle industrial assignments.
B.Tech (Civil Engineering)	BCIES1-801	Transportation Engineering II	BCIES1-801.CO1	get knowledge of history of railways & latest advancements in railways .
			BCIES1-801.CO2	employ Railway Track specifications and perform geometric design of the railway track.
			BCIES1-801.CO3	design turnout and crossings as per the Indian Railways as well as knowledge of stations, yards and signaling & control system.
			BCIES1-801.CO4	get knowledge of Air transport in India as well as Airport planning.
			BCIES1-801.CO5	get knowledge of the airport pavements including air-side marking & lighting.


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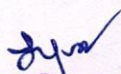
B.Tech (Civil Engineering)	BCIED1- 813	Environmental Impact Assessment & Life Cycle Analysis	BCIED1- 813.CO1	understand the concept and basic process of environmental impact assessment
			BCIED1- 813.CO2	get familiarity with specific models and methodologies used for impact prediction on the physical-chemical (air, surface water, soil and ground water, noise), biological (habitat and nonhabitat), cultural (historic, archaeological, visual), and socioeconomic (traffic, jobs, housing) components of the environment
			BCIED1- 813.CO3	practical exercises to provide students with the knowledge and skills necessary to enable them to undertake environmental impact assessment.
B.Tech (Civil Engineering)	BCIED1- 822	Bridge Engineering	BCIED1- 822.CO1	analyze, Report, how to select the bridge type from different types of bridges, How to select bridge site and its needs.
			BCIED1- 822.CO2	specify various sub-surface investigations required for bridge construction and further use them to calculate the hydraulic design requirements of different bridges.
			BCIED1- 822.CO3	implement standard loading specifications for bridge design followed by IRC codes.
			BCIED1- 822.CO4	analyze various types of bearings and joints, Maintenance in bridge structures.
B.Tech (Civil Engineering)	BMEE0 – F91	Industrial Safety and Environment	BMEE0 – F91.CO1	understand importance of safety at work
			BMEE0 – F91.CO2	understand various safety measures and how it leads to increasing plant productivity
			BMEE0 – F91.CO3	understand basics of environmental design
			BMEE0 – F91.CO4	understand the control of Ventilation and heat etc


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B.Tech (Civil Engineering)	BCIES1- 802	Advance Inspection & Testing Lab	BCIES1- 802.CO1	perform different NDTs on hardened concrete and highway
			BCIES1- 802.CO2	improve quality control during construction.
			BCIES1- 802.CO3	improve product reliability.
			BCIES1- 802.CO4	give information on repair criteria.
			BCIES1- 802.CO5	predict accident prevention analysis and to reduce costs.
B.Tech (Civil Engineering)	BCIES1- 803	Project-II	BCIES1- 803.CO1	demonstrate a depth of knowledge of Civil Engineering.
			BCIES1- 803.CO2	demonstrate knowledge of contemporary issues in their chosen field of research.
			BCIES1- 803.CO3	design engineering solutions to complex problems utilizing a systems approach.
			BCIES1- 803.CO4	communicate with engineers and the community at large in written and oral forms.


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